Site Need Statement

General Reference Information	
1 *	***Need Title*:** Grab Sampling Dose Reduction
2 *	***Need Code:*** RL-WT107
3 *	***Need Summary*:** Upgrade the grab sampling equipment to reduce radiation local exposure, improve upon the operability, reduce waste generation, while supporting sampling requirements for the Double Shell Tank Life Extension Project and other on-going sampling (e.g., Single Shell Tank retrieval demonstrations and studies supporting waste feed delivery planning for the Waste Treatment and Immobilization efforts.
4 *	***Origination Date*:** November 2001
5 *	***Need Type*:** Technology Need
6	***Operation Office*:** Office of River Protection (ORP)
7	***Geographic Site Name*:** Hanford Site
8 *	***Project*:** Safe Storage – Characterization ***PBS No:*** RL-TW03
9 *	***National Priority:*** ____1. High - Critical to the success of the EM program, and a solution is required to achieve the current planned cost and schedule. _X_2. Medium - Provides substantial benefit to EM program projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays). ____3. Low - Provides opportunities for significant, but lower cost savings or risk reduction, may reduce the uncertainty in EM program project success.
10	***Operations Office Priority*:**
Problem Description Information	
11	***Operations Office Program Description*:** The overall purpose of the safe-storage function is to operat maintain the double shell tank (DST) and single shell tank (SST) farms in a safe and compliant manner until th contained wastes are retrieved and the tank farms are ready for closure. This includes performing day-to-day operations, maintaining and upgrading infrastructure, resolving safety issues, assessing tank integrity, characte the waste, and managing the DST waste inventory. This function also includes interim stabilization of selected The end state of safe storage is containment of DST and SST tank wastes in a manner that supports safe waste retrieval for final waste disposal; tank-farm structures, including DSTs and SSTs, ready for final disposal and closure; and tank farms amenable and ready for the mitigation of any environmental releases that occurred duri storage and retrieval of tank waste.
12	***Need/Problem Description*:** In order to reduce dose exposure and simplify the grab sampling operation to meet future sampling requirements the following will need to be developed: 1. Replace the current disposable glove bag with a stainless steel glove box. The disposable glove bag requires temporary shielding and high spare parts inventory. Converting to the steel glove box will reduce spare parts inventory. Thus reducing the amount of mixed waste in the grab sampling campaign for disposal. Using the steel glove box will also eliminate the need for temporary shielding, reducing sampling time by decreasing the inspection time for the glove box, and eliminating one operator from the sampling crew. 2. Relocate the retrieval device from top of the glove bag/box to inside the side port of the glove bag/box by using an "off-the-shelf model". This relocation move will eliminate the requirement for the operator to stand on a ladder and reduce his radiation exposure received from the shine from the open riser. The redesign of the retrieval device will also reduce the current grab sampler retrieval cost and eliminate long delivery of parts by going to an "off-the-shelf model". 3. Develop a containment housing and stand for the new hand winch retrieval assembly for use in either the glove bag or those occasions where one must sample over open riser. 4. Modify the grab sampler cage (grab sampler assembly) to a hinge style so that extension tools can be used to remove the sample bottle. The current double bail model does not allow the use of extension tools to be used to remove the sample bottle from the sampler assembly. 5. Modify the grab sampler cage to accept a 500 ml amber sample bottle. Amber sample bottles are currently used for

	the Evaporator campaign samples. Converting to the 500 ml amber sample bottle for the Evaporator campaign samples would reduce exposure by 50% for this sampling campaign. 6. Modify the grab sampler cage to un-stopper and re-stopper the sample bottle at the desired depth. 7. Modify the grab sampler cage release mechanism to reduce the stopper release force. In the 500 ml wide mouth sample bottle case, 85 lb_f must be overcome in order to release the stopper from the sample bottle when sampling a full tank. 8. Segmented mast assembly 9. Combination spray wash ring/riser adapter for mast decontamination 10. Foot clamp sized for the mast requiring 60-100 psi Nitrogen or compressed air source. On application of pneumatic pressure, the Foot clamp jaws will open and allow movement or insertion of the mast segments. Upon loss of air, the Foot clamp jaws will close to retain the mast. 11. Spray wash nozzles mounted in the top flange of the mast for the sample bottles. 12. Bellows plate or transition assembly for mating with the glove box. **Program Baseline Summary (PBS) No.:** TW03 ** **Work Breakdown Structure (WBS) No.:** 05.01.03.06.06.02 (Characterization) ** **TIP No.:** TBD; this will be put into operation as soon as available as noted in Schedule Requirements
13	***Functional Performance Requirements*:** See items 1-12 under the Need/Problem Description (section 12 above)
**	***Schedule Requirements:*** Support Characterization Project Operations ongoing sampling such as support for caustic addition for Double Shell Tank Life Extension, for saltwell pumping (Interim Stabilization), and planning for feed delivery to the Waste Treatment Plant
14	***Definition of Solution*:** A cold tested working unit ready for operational readiness review and subsequent hot deployment.
15 *	***Targeted Focus Area*:** Tanks Focus Area (TFA)
16	***Potential Benefits*:** The major benefit is radiation dose exposure reduction. Operating crew currently receiving 200-300mR/yr under the current operation. The proposed modifications to the grab sampling operation is estimated to bring the whole body exposure to 100-150mR/yr..
17 *	***Potential Cost Savings*:** $70,000/yr
18 *	***Potential Cost Savings Narrative*:** Potential cost savings found in the reduction of spare parts that must be maintained in warehouse inventory, reduction in mixed waste disposal costs, eliminate the paper work involved in temporary shielding permits, elimination of glove bag inspection that take 1-1.5 hours to perform in the field, and reduction in whole body dose.
19	***Cultural/Stakeholder Basis*:** Stakeholders strongly support the DOE and OSHA compliance with ALARA considerations for personnel radiation exposure.
**	***Technical Basis:*** As Low As Reasonably Achievable (ALARA) considerations for personnel radiation exposure are a corner stone of worker safety and engineering considerations for equipment design and operation in the Tank Farms.
20	***Environment, Safety, and Health Basis*:** Both DOE and OSHA requirements dictate ALARA considerations for personnel radiation exposure.
21	***Regulatory Drivers*:**
22 *	***Milestones*:** M-45 series single shell tank retrieval TPA milestones, interim stabilization milestones, waste feed delivery for the Waste Treatment Plant
23 *	***Material Streams*:** Sludge, salt, liquid (RL-HLW-20)
24	***TSD System*:** Double Shell Tank and Single Shell Tank systems
25	***Major Contaminants*:** Pu-238, 239, 240, 241; Am-241; U-238; C-14; Ni-59/63; Nb-94; Tc-99; I-129; Cm-242; Sr-90; Cs-137; Sn-126; Se-79; chromium; nitrate; nitrite; complexants (EDTA/HEDTA).
26	***Contaminated Media*:** Tank waste consisting of high molarity sodium hydroxide/sodium nitrate solution containing saturated salt cake/and or sludge.

27	***Volume/Size of Contaminated Media*:** The single shell tanks are generally 75 ft. in diameter, and up to 40 feet deep with their tops buried about 10 feet below the ground surface. All double shell tanks are 75 feet in diameter, and about 40 feet deep and are similarly buried.
28 *	***Earliest Date Required*:** FY 2002
29 *	***Latest Date Required*:** When the Hanford Waste Treatment and Immobilization Plant is ready to receive the last of the retrieved High Level Waste (HLW) feed for staging currently scheduled for the 2020's.
Baseline Technology Information	
30	***Baseline Technology(ies)/Process*:** **Technology Insertion Point:** Supports M-45 series; Interim stabilization, and waste feed delivery to Waste Treatment Plant as well as DST Life Extension. TBD; this will be put into operation as soon as available.
31	***Life-Cycle Cost Using Baseline*:**
32	***Uncertainty on Baseline Life-Cycle Cost*:**
33	***Completion Date Using Baseline:*** 2028
Points of Contact (POC)	
34	***Contractor End User POCs*:** R. N. (Rob) Dale, CHG, 509-373-9207, F/509-373-4238, Robert_N_Rob_Dale@rl.gov
35	***DOE End User POCs*:** Wen-Shou Liou, ORP, 509-373-9879, F/509-373-1313, Wen-Shou_Liou@rl.gov
36**	***Other Contacts:*** K.A. (Ken) Gasper, CHG, 509-373-1948, F/509-376-1788, Kenneth_A_Ken_Gasper@rl.gov

*Element of a Site Need Statement appearing in IPABS-IS
**Element of a Site Need Statement required by CHG